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ARMY ENVIRONMENTAL HYGIENE AGENCY ABERDEEN PROVING GR--ETC F/G 6/6  
GUIDE FOR THE PREVENTION, CONTROL, AND CLEANUP OF PESTICIDE FIR--ETC(U)

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**UNITED STATES ARMY  
ENVIRONMENTAL HYGIENE  
AGENCY**

**ABERDEEN PROVING GROUND, MD 21010**

GUIDE FOR THE PREVENTION, CONTROL, AND CLEANUP OF PESTICIDE FIRES

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DEPARTMENT OF THE ARMY  
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ABERDEEN PROVING GROUND, MARYLAND 21010

HSE-RP/MP Technical Guide No. 117

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GUIDE FOR THE PREVENTION, CONTROL, AND CLEANUP OF PESTICIDE FIRES

1. INTRODUCTION.

a. A pesticide fire, as with a fire involving any toxic chemical, contains tremendous destructive power. The usual hazards presented by a fire are compounded by the danger of pesticide poisoning and widespread environmental contamination. Proper planning and training can greatly reduce the personal harm and environmental damage possible during a pesticide fire. This guide has been prepared to aid installation personnel preplan, fight, and clean up after a pesticide fire.

b. This guide is not a regulation and therefore does not interfere with existing responsibilities. The intent is to assist installation personnel to deal with pesticide fires by presenting general standards of good practice.

c. Slide presentations entitled "Agricultural Chemical Emergencies, Spills and Fires" and "Firefighting Tactics, Agricultural Pesticides and Fertilizers" which contain the same information as this guide are available for loan by writing to: Chevron Chemical Company, Employee Relations - Safety, PO Box 3744, San Francisco, CA 94119.

d. A training package for firefighters entitled "Pesticide Fire and Spill Control" (January 1980) is available at a cost of \$250 from: National Fire Protection Association, Publication Department, 470 Atlantic Avenue, Boston, MA 02210, telephone (617) 482-8755. This package is available on loan from the US Army Environmental Hygiene Agency (USA-EHA) and may also be available from a local, State, or city fire academy.

2. PREFIRE PLANNING.

a. General. The success of minimizing the hazard to the health and environment during a pesticide fire will depend upon adequate prefire planning. Time-consuming preparations and difficult decisions should be made in advance rather than during an emergency situation. All applicable organizations, particularly the fire department, should participate in the preparation of the prefire plan. The plan should be put in writing so that all appropriate organizations can be notified [as specified in 40 CFR 165.10(g)(1), reference 2]. It should be updated at least annually, and more frequently if major changes of pesticides stored or modifications to the facility are made. An added benefit of prefire planning is that potential hazards are often identified and eliminated. The prefire plan should represent a detailed analysis of the installation's procedures to handle a toxic chemical fire and should address those points listed below.

b. Facility Floor Plan. Include a floor plan of the facility where pesticides are located which shows, at a minimum, permanent inside walls and all external openings such as doors and windows. The areas of the facility committed to pesticides, particularly storage, should be identified.

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c. Access Routes. Include the identification of access routes. Insure that alternate access routes to the pesticide facility from all directions are included because normal access may be blocked by toxic smoke. Smoke from a pesticide fire is not a nuisance that can be driven through, but must be presumed highly toxic.

d. Evacuation Routes. Include identification of evacuation routes that have been worked out with the installation police. As discussed above, evacuation routes must be developed in all directions so that toxic smoke can be avoided. This plan should also include procedures to secure the area to prevent unauthorized entry.

e. Water Runoff Control. Planning water runoff control is a very important part of prefire planning. Identify where there is a potential for water runoff and determine how to prevent contamination of waterways. Arrangements for equipment and supplies necessary to construct dikes or dams should be included in the prefire plan. Do not rely solely on equipment and supplies located at or near the pesticide facility as they may be inaccessible because of toxic smoke.

f. Map of Area. Include a map (may be hand drawn) of the area surrounding the site of the pesticide facility. The map should include: location of water supplies; perimeter fences, with all gates shown; adjacent buildings/activities with contents/functions of each shown; nearby ditches, underground drains, creeks and rivers with arrows to show direction of flow; building access and evacuation routes; where and how the water runoff may be blocked; and north arrow.

g. Emergency Telephone Numbers. Include a list of telephone numbers where key personnel can be contacted day or night. As a minimum this list should include the following:

(1) The pesticide facility supervisor who must be contacted as soon as possible because he will know what pesticides are currently located in the facility.

(2) A physician who is familiar with pesticide poisoning.

(3) The local poison control center.

(4) The CHEMTREC (800-424-9300).

(5) Any emergency numbers listed on the pesticide labels, so that liaison can be maintained with the pesticide manufacturer during the emergency.

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(6) The Regional US Environmental Protection Agency (EPA) Office and the comparable State agency.

(7) The Coast Guard, if water runoff can reach a waterway.

h. Medical Assistance. The prefire plan should make provisions for medical assistance to personnel contaminated with pesticides. Local hospitals and poison control centers must be aware of the hazards of a pesticide fire so that poisoning or other pesticide-related illnesses can be properly treated. A plan should be formulated to establish a first-aid center near the fire site. The primary purpose of this center would be to provide medical checks to firefighters. The center would also provide assistance to other personnel who show symptoms of pesticide poisoning. Detailed guidance on how to prepare for pesticide poisonings can be obtained from the pesticide label and the USAEHA Occupational and Environmental Medicine Division.

i. Salvage/Hazard Evaluation. An important component of the prefire plan is to make a salvage-versus-hazard evaluation to decide whether or not to let the facility burn in the event of a fire. This evaluation balances the salvage value of the facility and its contents against the hazards of fighting the fire which include widespread contamination by water runoff or toxic fallout from contaminated steam and toxic compounds released into the air from the incomplete combustion of the pesticides. If the decision cannot be made during prefire planning, then an agreement should be prepared (in writing) with the fire department which allows the on-scene commanding officer of the firefighting unit to determine whether or not to let the facility burn.

j. Safety Briefings. The prefire plan should make provisions for periodic safety briefings for all appropriate personnel. These briefings should include, as a minimum, familiarization with first-aid procedures and symptoms of pesticide poisoning. Basic first-aid procedures and symptoms of pesticide poisoning are presented in Appendix A.

k. Informing Emergency Organizations. A copy of the prefire plan and each annual update should be provided to each emergency organization or service that would be involved in a pesticide fire.

3. BURNING CHARACTERISTICS OF PESTICIDES. While not all pesticides are flammable, they will decompose in the heat of a fire and may release toxic gases, vapors, and smoke. Installation pesticide storage facilities usually store a wide variety of pesticides. Therefore, unless it is known specifically what is burning, it must be assumed that highly toxic substances are being produced. Burning characteristics of commonly encountered formulations are described in Appendix B.

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4. FIRE NOTIFICATION PROCEDURES.

a. When a fire is discovered, all nearby personnel should be alerted and the fire department contacted. Fight the fire only if it can be done safely; otherwise evacuate to an upwind position. When fighting the fire, appropriate personal protective equipment must be worn. Fighting the fire before notification of the fire department is done only if it is certain that the fire can be easily extinguished.

b. Upon receipt of a call, the dispatcher of the fire department will, in addition to the dispatch of firefighting units:

(1) Contact the facility supervisor. The supervisor should be present at the fire because he will know which pesticides are present, how much of each, and where they are located. The last inventory may not be accurate as the location and quantity of the pesticides stored often change.

(2) Alert medical personnel. Medical care must be available to treat pesticide poisoning which may occur to personnel downwind as well as firefighters.

(3) Contact installation police. The police may need to implement the evacuation plan and isolate the area surrounding the fire. The police may also have to patrol the area to prevent reentry into the evacuated area.

(4) Contact CHEMTREC. It is important that liaison with CHEMTREC be initiated as soon as possible so that important technical data and poison control information will be available when needed.

5. FIREFIGHTING TACTICS.

a. The first action that must be taken upon arrival at the fire site is to decide whether or not to let the facility burn. If this decision was not made during the prefire planning, then it is made by the commanding officer of the firefighting unit, based upon contingency plans formed during the prefire planning.

b. Firefighters should wear personal protective equipment consisting of rubber or neoprene gloves, boots, turnouts, and hat. A self-contained breathing apparatus (Air Pak) should be worn whenever fighting a pesticide fire. The protective equipment mentioned above are standard components of onsite firefighting equipment and therefore should be on hand at the installation fire department.

c. Avoid contact with pesticide material, smoke, mist, and water runoff. Be alert for symptoms of poisoning. In case of contact, leave site immediately and apply first-aid procedures. Wash face and hands before



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eating, drinking, smoking, or using the toilet. Do not put fingers in mouth or rub eyes. If turnout clothing becomes soaked through after contact with fallout, leave fire site immediately, remove contaminated clothing, and shower.

d. The fire should be attacked from upwind to avoid toxic smoke and from a safe distance so that firefighters are clear of the danger of exploding containers.

e. The fire should be contained by cooling adjoining structures to prevent spread of the fire.

f. As little water as possible should be used when fighting a pesticide fire. Water runoff, which must be assumed toxic, can be a serious problem because the water will spread contamination over a wide area. The water runoff control plan should be implemented to contain the contaminated water within as small an area as possible. Water will cool the burning pesticides and may prevent the decomposition of the pesticides into less toxic compounds. Steam from water on the fire can result in toxic fallout which could spread contamination far from the fire site.

g. The fog spray, which is most effective, should be used against pesticide fires. Straight stream should not be used because it will break bags and bottles which may result in adding fuel to the fire and increasing the amount and area of contamination.

h. Firefighters should remove protective clothing upon leaving the fire site. This clothing should be impounded with contaminated equipment awaiting decontamination. At the fire station they must shower and shampoo thoroughly and change into clean clothing. Inner clothing worn while fighting the fire should be washed in detergent and bleach in a separate wash load.

i. Contaminated firefighting protective clothing and equipment should be decontaminated by washing thoroughly with a strong detergent. Coveralls, gloves, and boots should be worn when decontaminating equipment. Cotton-jacketed hoses may have to be discarded because they can be weakened by detergent.

## 6. POSTFIRE CLEANUP.

a. The fire scene should be secured to keep out unauthorized personnel until cleanup and decontamination have been completed.

b. Appropriate Federal, State and local organizations (i.e., Regional EPA Office, the comparable State agency and the State Public Health Office) should be included when developing the cleanup plan. For example, these agencies must participate in the location of an "approved" site for disposal of pesticide-contaminated waste and debris.

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c. All workers participating in the cleanup operations must be thoroughly briefed on the potential hazards. They must also be aware of first-aid procedures in case of contact with pesticides or contaminated material and symptoms of pesticide poisoning.

d. All personnel working within the fire site during cleanup should wear, as a minimum, personal protective equipment consisting of gloves, boots, coveralls and respirator. A list of protective equipment approved for handling pesticides is contained in TIM 14 (reference 1).

e. A "clean area" should be established to provide a break area for the cleanup crew. This area should have eating and toilet facilities. A place should be included to remove and hang up contaminated protective clothing and to wash up before entering the clean area.

f. When leaving the fire site at the end of the duty day or when work is completed, workers should remove contaminated clothing, shower thoroughly, and change to clean clothing. Contaminated clothing should be washed in detergent and bleach in a separate wash load.

g. Materials-handling equipment should be used whenever possible to minimize human contact with contaminated debris. All equipment should be made of metal to expedite decontamination. Porous materials, such as wood, cannot be decontaminated and therefore must be destroyed if contaminated. Vehicles used to transport debris must be enclosed and leakproof to prevent the spread of contaminated material along the route to the disposal site.

h. Dikes should be constructed around drains to prevent spilled pesticide or other contaminated material from entering the storm and sanitary sewer systems during cleanup.

i. Pesticide containers must be handled carefully to prevent spillage of the contents as they may have been damaged during the fire.

j. Concentrated pesticides that are spilled during the postfire cleanup should be cleaned up as follows:

(1) Stop the leak. Do whatever is necessary, such as uprighting the container, to limit the spill.

(2) Confine the spill to prevent it from spreading. Encircle a liquid spill with a dike of sand or absorbent material.

(3) Always work in a well ventilated area because most pesticides liberate toxic fumes or vapors. Open enclosed areas to prevent the accumulation of toxic fumes while working. If it is impossible to ventilate, do not proceed with cleanup until a self-contained breathing apparatus is

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available. NEVER WORK ALONE. Always maintain eye contact with a work partner.

(4) Clean up spills immediately or cover a liquid spill with absorbent material and a dry spill with a secured tarpaulin.

(a) Dry Spills. Sweep up the pesticide material and place it in plastic bags. Avoid brisk movements to keep dust from swirling. Under windy conditions, lightly moisten the pesticide. The bagged pesticide should be taken to the disposal site with other debris.

(b) Liquid Spills. Absorb liquid pesticide with absorbent material, then sweep up the material and place it in plastic bags. Work or rub the material into the pesticide either by broom or boot to absorb as much as possible. The bagged pesticide and absorbent material should be taken to the disposal site with other debris. Soil at the spill site should be removed to a depth of 6 inches below the wet surface line and taken to the disposal site. Soil samples should be taken and analyzed to assure that all the contaminated soil has been removed before fresh soil is added.

(5) Remove and replace wood and other porous materials because they cannot be adequately decontaminated.

k. The debris should be lightly sprinkled with water to reduce toxic dust. Use water sparingly as excess will have to be treated as a liquid spill.

l. Soil exposed to water runoff should be removed to a depth of at least 2 inches below the moist soil and taken to the disposal site. Soil samples should be taken and analyzed to assure that all the contaminated soil has been removed before fresh soil is added.

m. After the debris has been cleared, the fire site should be decontaminated. Work the decontamination solution that has been recommended by CHEMTREC or a pesticide manufacturer into all surfaces using stiff brooms. Soak up the solution with absorbent material. Sweep up the absorbent material, place it in a plastic bag, and take it to the disposal site.

n. When the cleanup of the fire site is completed, the equipment must be decontaminated. Discard or destroy contaminated equipment which contains porous material, such as wood handles or leather shoes, because they cannot be effectively decontaminated. Wash the equipment with soap and water, then apply the recommended decontamination solution with a brush or mop. All surfaces should be thoroughly rinsed using a sparing amount of water. All wash and rinse water should be collected for disposal.

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**7. TECHNICAL ASSISTANCE.** Informal technical advice and/or consultation concerning the material presented in the guide may be obtained by telephone. Questions should be directed to the Program Manager of the Pest Management Program at AUTOVON 584-3015. Requests for assistance should be submitted in writing through proper command channels to Commander, US Army Health Services Command, ATTN: HSPA-P, Fort Sam Houston, TX 78234.

APPENDIX A

FIRST-AID PROCEDURES

1. In the event of pesticide contact, perform basic first-aid procedures and get medical attention immediately. If possible take labeled container.
2. The basic first-aid procedures in the event of pesticide contact are: If in the eye, flush eye with water for 15 minutes; if on clothing, remove contaminated clothing and wash skin with soap and water; wash contaminated clothing with strong detergent before reusing.
3. The pesticide labels should be reviewed for any additional first-aid procedures. Duplicate labels should be on file away from storage site.
4. The symptoms of pesticide poisoning include blurred vision, difficulty in breathing, severe running nose, nausea, drooling, tearing, unusual amount of sweating, stomach cramps, and trembling. Pesticide poisoning symptoms often resemble those for heat prostration, smoke inhalation, and the flu. In general, it should be emphasized that medical attention should be obtained if any feeling of discomfort or illness or unusual appearance occurs.
5. Remain alert to symptoms of pesticide poisoning because the symptoms may be delayed up to 12 hours after exposure.

APPENDIX B

FORMULATION BURNING CHARACTERISTICS

1. **Wettable Powder Formulations.** Wettable powder pesticide formulations consist of pesticide on or mixed with clay. Since clay will not burn, the only potential for fire is the bag.
2. **Water-based Formulations.** Water-based pesticide formulations do not pose a fire hazard because of the water. There is, however, the potential for contaminated steam if exposed to fire.
3. **Solvent-based Formulations.** Solvent-based pesticide formulations contain petroleum distillates such as xylene, toluene, and petroleum oils (i.e., fuel oils, mineral oils, and mineral spirits). The solvents used in pesticide formulations are generally flammable and, as a result, these pesticide formulations pose the greatest fire hazard.
4. **Pesticide/Fertilizer Formulations.** Pesticide and fertilizer formulations contain ammonium sulfate and/or ammonium phosphate as the fertilizer. These fertilizers will not burn but, like pesticides, will decompose and release toxic gases or smoke in the heat of a fire.

APPENDIX C

REFERENCES

1. Armed Forces Pest Control Board Technical Information Memorandum (TIM) 14, Protective Equipment for Pest Control Personnel, 1978.
2. Title 40, Code of Federal Regulations (CFR), 1979 ed., Section 165.10, Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers.
3. Pre-Planning and Guidelines for Handling Agricultural Chemical Fires. National Agricultural Chemicals Association, 1979.